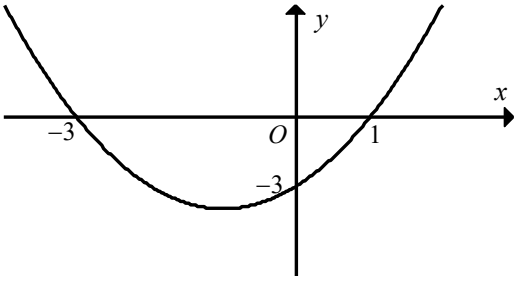
Question	Answer	Marks	Partial Marks
1(a)	$(x+1)^2-4$ oe $(-1, -4)$	**B3**	**B2** $y=(x+1)^2-4$ oe or **B1** $y=(x+1)^2+k$, where k is a constant
1(b)	Correct curve  	**B2**	**B1** for correct shape in 4 quadrants with minimum in the 3rd quadrant **B1** for an attempt at a quadratic graph with intercepts marked at –3 on the y-axis and –3 and 1 on the x-axis
2	$(3k-2)^2-4(2)(k)[*0]$	**M1**	Uses b^2-4ac * could be any inequality sign or =
	$9k^2-20k+4[*0]$	**A1**	Correctly simplifies to 3-term quadratic
	$(9k-2)(k-2)$	**M1**	**FT** Factorises or solves *their* 3-term quadratic
	Critical values $\frac{2}{9}$, 2	**A1**	
	$k<\frac{2}{9}$ $k>2$	**A1**	Mark final answer
3(a)	103 680	**2**	**M1** for $k\times5!\times4!\times3!$ where $k=1, 2, 3, 6$
3(b)	270	**3**	**M2** for ${}^5C_1\times{}^4C_2\times{}^3C_1+{}^5C_1\times{}^4C_1\times{}^3C_2+$ ${}^5C_2\times{}^4C_1\times{}^3C_1$ oe OR **M1** for at least one correct product If 0 scored then **SC1** for a final answer of 540 or 264

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Question	Answer	Marks	Partial Marks
4	$m_{AB} = \frac{-9-3}{6--4}$ oe isw or $-\frac{6}{5}$	**M1**	
	$[m_{\perp} =]\ \frac{5}{6}$ or $\frac{-1}{\text{their } m_{AB}}$	**M1**	**FT** *their* m_{AB} providing that $\frac{\text{difference in } y}{\text{difference in } x}$ attempted
	[Midpoint] $\left(\frac{-4+6}{2}, \frac{3-9}{2}\right)$ oe isw or $(1, -3)$	**M1**	
	Finds equation of perpendicular bisector: $y - \text{their } (-3) = -\frac{1}{\text{their}\left(-\frac{6}{5}\right)}(x - \text{their } 1)$ oe	**M1**	**FT** *their* perpendicular gradient providing gradient is $\frac{-1}{\text{their } m_{AB}}$ and using *their* midpoint *Their* midpoint must not be any of A, B, C or D
	$11x - 75 = \frac{5}{6}x - \frac{23}{6}$	**M1**	Eliminates one variable **dep** on previous **M** mark $11x - 75$ = *their* perp bisector equation
	$E(7, 2)$	**A1**	
	[Area CDE =] 40	**A1**	Dependent on all previous marks
5	$\frac{dy}{dx} = 2x\tan\frac{x}{2} + \frac{x^2}{2}\sec^2\frac{x}{2}$ oe	**2**	**B1** for $\frac{d}{dx}\left(\tan\frac{x}{2}\right) = \frac{1}{2}\sec^2\frac{x}{2}$ soi or **M1 FT** for a product rule of correct structure with *their* $\frac{d}{dx}\left(\tan\frac{x}{2}\right)$
	$\frac{\delta y}{h} = \text{their}\left.\frac{dy}{dx}\right\|_{x=\frac{\pi}{3}}$ or $\text{their}\left.\frac{dy}{dx}\right\|_{x=\frac{\pi}{3}} \times h$	**M1**	Correct small changes relationship
	$1.94h$	**A1**	Dependent on **B2**
6(a)	$(3x + 2)^{10}$ oe	**M2**	**M1** for $(3x + 2)^2$ soi
	$1024 + 15\,360x + 103\,680x^2$	**A2**	**A1** for any two terms correct or $2^{10} + 10(2^9)(3x) + 45(2^8)(3x)^2$ or for 3 correct terms seen but not summed e.g. a list After **M2 A0**, allow **SC1** for an answer of $59\,049x^{10} + 393\,660x^9 + 1\,180\,980x^8$

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